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Financing the Dairy System on a Central Blackland Farm

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SUMMARY

Many cash-crop farmers in the central Blacklands have shifted to dairy operations in recent years, and others are thinking of making the change. Since considerable initial expense is involved, credit considerations are important to most of those who contemplate the change.

The study reported here was an effort to determine the economic feasibility of changing from cash-crop to dairy farming on an 180-acre Blackland farm, and to assess the farm operator's ability to repay debt incurred to make the change. It also illustrates the essential features of planning a farm adjustment of this sort.

Results of the study indicate it takes an initial investment of $17,000 to $21,000 at 1955 prices to shift from cash-crops to a 36-cow dairy operation with a cow herd capable of producing 9,000 pounds of milk annually per cow. The good manager can expect to increase his net returns about $4,768 annually by making the change. The changeover would be profitable to him since additional returns of that amount would equal the initial costs in 4 to 4-½ years. Should he have no other source of income with which to repay a loan, it would take 4 to 6 years to liquidate an amortized debt of 75 to 100 percent of initial costs.

Should the operator prove less efficient as a dairyman, the annual net income gained by the shift would be less than $4,768. A cow herd capable of producing only 7,000 pounds of milk annually per cow would increase net income by only $1,526 above that obtained by the "above average" cash-crop manager. A shift of this sort would involve an initial cost smaller by $3,600 than that of the 9,000-pound-level cow herd. It would take 13 to 16 years (depending on the rate of interest charged) to liquidate an amortized debt of 75 percent of the initial cost out of the increased earnings. It is unlikely that credit agencies would be willing to finance the changeover for that length of time, unless the farmer had ample assets with which to secure the loan.

The varying price relationship between cash-crops and milk, changes in the relative costs between dairy and cash-crop operations, and weather, disease and other hazards cause the additional returns to be more or less in any 1 year than the average expected over a period of years. This relationship should be considered in drawing up the repayment terms. If a rigid amount of annual payment is required, the time in which the loan is to be liquidated should be extended to decrease annual payments — possibly as much as 25 to 40 percent — below the expected average of additional returns. A flexible plan by which annual payments on debt are contracted at some proportion of the realized returns each year seems a better plan for both the farmer and the credit agency. This would assure liquidation of the debt as rapidly as possible.

This study emphasizes the necessity of a farmer doing some careful planning to determine as accurately as possible (1) the initial expense of changing from cash-crop to dairying, (2) the amount he will need to borrow, (3) the amount he will have annually with which to repay the loan and (4) the credit terms that best fit his particular conditions. By doing so, he will be helping both himself and the lending agency to provide his credit needs.

Financing the Dairy System on a Central Blackland Farm

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INTRODUCTION

Texas agriculture has changed rapidly in recent years. An overall trend has occurred toward larger farms and fewer farmers in much of Texas, from cash-crop to livestock production in some areas, and an increase in the use of supplemental irrigation and mechanical harvesting in many parts of the State.

The present-day farmer must adopt new and more efficient machinery, and use better seed varieties, fertilizers and insecticides as they are developed. It may be necessary to enlarge his operations if possible, or to change his entire system to make profitable use of the more productive means of farming provided by research. To gain the most profit from his operations, it is as important for the farmer to recognize the need for change when it occurs, and to make the adjustment as soon as it is economically feasible, as it is for him to carry on his operations efficiently.

Problems of Farm Adjustments

Agricultural leaders have become increasingly aware of the need to speed up farm adjustments. For while new inventions and results from research are the primary motivating forces that make adjustments necessary, much of the farm's profits can be lost if the operator waits too long before he adopts the improvements.

The farm operator faces two major problems as a result of the changing conditions of farming. First, he must determine whether a particular adjustment or investment will be economically sound. Second, should he believe that the undertaking will improve his returns sufficiently to justify the change, he must decide how and under what conditions it can be financed. Credit plays an important role here. Some adjustments require considerable expense, and many farmers do not have the funds necessary to make them. If made, the farmers must use borrowed funds. Thus, adequate credit becomes an implement of change which facilitates needed adjustments in farming. The lack of credit may seriously retard such adjustments.

The shift from cash-crop to dairy farming in the central Blacklands is such a case. Some farmers have made the change in recent years, others are in the process of making it, and no doubt many question whether it would be feasible. Frequently credit institutions require that loans for such adjustments be paid back in 1, 2, or at the most, 3 years. The additional returns to be obtained from dairying may not be sufficient on some farms to pay the loan off in this limited time, but they may be forthcoming over a longer period.

It is felt by some that this credit problem may exist because the lending agencies have not had sufficiently reliable information about the amount of funds needed to make adjustments, and when the returns will be available from which the loan and its costs can be repaid. Often the farmer himself has failed in adequately planning his need of funds, what he can reasonably expect in the way of returns and when those returns will be obtained.

Objectives of the Present Study

The present study was an effort to determine, for a particular type and size of farm in the central Blacklands: (1) the finances needed to change from a cash-crop to a dairy system, (2) the returns that can be expected from the change and (3) the length of time required to repay a debt, incurred to make the change, from the additional returns that may be obtained.

Many problems arise in a study of this nature. Individual farms in the Blacklands vary widely in type and size. Some have a small acreage while others are large. The proportion of cultivated land varies from farm to farm, even though the farms may be of similar size. Farms may differ widely in the type of soil and those with similar soil types may differ in productive capabilities—some are more eroded than others, some have had their fertility depleted, and the

CONTENTS

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structure of the soil differs as a result of the way it has been farmed. Farm operators differ in the experience they have had with dairying, in their capabilities as managers and in the amount of capital they have available with which to farm and make adjustments.

It would be impossible to analyze all possible existing conditions on individual farms, or to provide a plan that, in any sense, can be "typical" of all farms in the area. Therefore, a plan has been set up, based on past research findings, that approximates the situation of many farms in certain parts of the Blacklands. Enough information is provided so that other farms may find the study useful by changing some of the data to more nearly fit their particular conditions.

One useful aspect of the study is that it illustrates important considerations in planning a major change in farming. The budget method of planning can be used by all farm operators with widely different physical and economic conditions, and for planning most any type of adjustment they may face.

THE FARM AND ITS RESOURCES

The farm used was an 180-acre Blackland unit consisting of 106 acres of cultivated land, 72 acres of pasture land and 2 acres of homestead and roads. This is based on the median size and makeup of dairy farms studied in the area.

Production and yields from the cropland are based on the following land capability units:

Capability unit[1]	Acres
I_2	17
II_2	63
III_2	13
II_{2x}	13
Total cropland	106

[1]The following is a description based on the Soil Conservation Service's Blackland Prairie land capability guide.

I_2 Very good land that can be cultivated safely with ordinary good farming methods. Deep, fine textured, slowly permeable soils, sloping 1 foot or less per 100 feet with none to slight erosion having occurred.

II_2 Good land that can be cultivated safely with easily applied conservation practices. Deep, fine textured, slowly permeable soils, sloping 1 to 3 feet per 100 feet with erosion conditions of none to slight, moderate or moderately severe, depending on its past use.

III_2 Moderately good land that can be cultivated safely with some intensive conservation treatments. Deep, fine textured, slowly permeable soils, sloping 3 to 5 feet per 100 feet with erosion conditions of none to slight, moderate or moderately severe, depending on its past use.

II_{2x} Good land that can be cultivated safely with easily applied conservation practices. Deep, fine textured, moderately permeable soils, sloping 1 to 3 feet per 100 feet with erosion conditions none to slight, moderate or moderately severe, depending on its past use.

A fairly high level of soil management and crop production was assumed. Therefore, yield data are higher and management practices better than on many farms in the area with similar land capability units. One reason for assuming "better-than-average" management is the favor the good operator has with credit agencies and the likelihood that most of the adjustments to dairying are made by this group.

The cash-crop farmer usually has the necessary equipment and machinery for crop farming, and much of it can be used for dairying. He also may have some improvements such as fencing, a water system and some buildings that can be used when he shifts to dairy production.

Expenses are ignored in this study if there is reason that they would be incurred about equally by both the cash-crop and the dairy system. The aim was to determine the difference in net income between the two systems. This difference is the returns realized from the adjustment, and its size determines whether the cost of the changeover is justified. If machinery costs and repairs are the same for both the cash-crop and the dairy system and amounts to $500, the difference in the net income between the two systems would be the same whether the $500 was or was not subtracted from the income of both systems. Therefore, similar expenses are ignored so that the analyses will be simpler.

Only two setups are analyzed—a cash-crop operation exclusive of livestock and a 36-cow dairy operation.

THE CASH-CROP SYSTEM

The cropping plan for the cash-crop system, Table 1, involves a 3-year rotation fitted to recommended practices for a high level of production and considers acreage controls on cotton. The system consists of a rotation of 30 acres of cotton, 41 acres of corn and 35 acres of oats-clover. Fertilizer is applied only to the oats-clover acreage.

Corn or grain sorghum could be used as the grain crop in the crop system. Corn was chosen because it seemed more profitable when grown for cash sale on the basis of expected yields and 1955 price relationships. Should the price of grain sorghum increase relative to the corn price, or should higher-yielding hybrid grain sorghums become available, it may be more profitable to substitute grain sorghum for corn.

The oats-clover acreage was grown for soil-improving purposes and was fertilized with 200 pounds of superphosphate per acre in line with recommendations based on experimental findings. Oats were harvested and sold as grain, and the clover was turned under.

Average annual yields of the crops were based on experimental findings adjusted to what reasonably could be expected on farms under good management and on the soil types mentioned

earlier. The yields used were 270 pounds of lint cotton, 40 bushels of corn and 45 bushels of oats per acre. Cottonseed yield was computed at 800 pounds per bale (500 pounds of lint) of cotton. Prices were the average of those received by farmers in the area in 1955 and amounted to 30 cents per pound for cotton, $43 per ton for cottonseed, $1.20 per bushel for corn and 70 cents per bushel for oats.

A farmer with higher or lower productive land than used here should adjust his yields accordingly. Similarly, should he expect higher or lower prices than those used here, he should adjust prices in line with his expectations.

Gross returns from crop sales, under the conditions specified and at 1955 prices, would average about $5,779 annually. Slightly less than half of this comes from the cotton crop, about a third from corn and a fifth from oats.

Table 2 contains expenses of the cash-crop system and information about the way they were computed. Land costs, part of the machinery and equipment depreciation and repair costs (that machinery and equipment used by the cash-crop system and carried over for use in the dairy), and most field operation costs were not computed as expenses in the study since they would be approximately the same for both cash-crop and dairy operations.

Labor costs (with the exception of cotton harvest, weeding and labor included in certain custom operations) were not considered. The farm family probably could provide the necessary labor for both the cash-crop and 36-cow dairy operations. Dairy operations, however, are more confining and provide less free time for recreation and other activities by the farm family. Farmers should consider carefully this aspect if they contemplate a change to dairying.

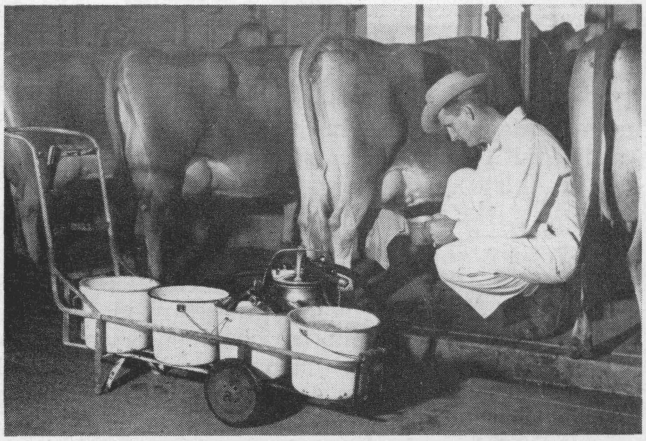
TABLE 1. ACRES, YIELDS, TOTAL PRODUCTION AND RETURNS FROM THE CASH-CROP SYSTEM

Crops	Acres in crop	Yield per acre[1]	Total production	Sales	
				Price per unit[2]	Total value
Cotton	30	270 lb. lint	8,100 lb.	.30 lb.	$2,430.00
Cotton-seed	—	432 lb.	6.48 tons	$43 ton	278.64
Corn	41	40 bu.	1,640 bu.	$ 1.20 bu.	1,968.00
Oats-clover	35	45 bu.[3]	1,575 bu.[3]	.70 bu.[3]	1,102.50
Total	106	——	——	——	$5,779.14

[1]Yields per acre are estimates of what could be expected under normal conditions with good crop management practices on the soil capability units given in the text. They were based on experiment station findings, but were adjusted to a lower level than average experiment station yields in view of more intensive practices and less loss at the stations than is normal on farms.

[2]Price per unit is the average price that prevailed in the area in 1955.

[3]Oats. Clover is turned under.



While dairy operations provide better year-round use of the family labor supply than crop farming, it is more confining and allows less time for recreation and other family activities.

Expenses in Table 2 amount to $1,726 which, when taken from the $5,779 gross income, leave $4,053 returns to the cash-crop system. While this figure excludes expenses that likely do not differ between the two systems being studied, it can be compared directly to a similarly computed return figure for the dairy operation to determine the extent to which net returns are increased by shifting to dairying.

THE DAIRY SYSTEM

How much money is required to finance a changeover from cash-crop to a 36-cow dairy operation on the 180-acre farm? The question

TABLE 2. OPERATING EXPENSES OF THE CASH-CROP SYSTEM

Expense item	Rate and practice[1]	Price of item[2]	Cost
Cotton:			
Seed	1 bu. acre	$ 4.00 bu.	$ 120.00
Chopping and hoeing	5 hrs. acre[3]	.50 hr.	75.00
Cotton snapping	1,900 lb. bale	$ 2.00 cwt.[4]	615.60
Ginning	1,900 lb. bale	.50 cwt.	153.90
Bag and ties		$ 3.50 bale	56.70
Insect control	3 appl. acre	.60 ac. appl.	54.00
Total			$1,075.20
Corn:			
Planting seed	1/6 b. acre	$12.00 bu.	$ 84.00
Harvest cost	Corn picker	$ 3.50 acre	143.50
Total			$ 227.50
Oats-clover:			
Seed oats	2 bu. acre	.90 bu.	$ 63.00
Clover seed	15 lb. acre	.12 lb.	63.00
Fertilizer	200 lb. acre	$35.00 ton	122.50
Harvest-oats	Windrowing	$ 1.50 acre	52.50
Oats	Combining	$ 3.50 acre	122.50
Total			$ 423.50
Crop expense[5]			$1,726.20[5]

[1]Based on research findings of the usual rates and practices in the area.

[2]1955 prices in the area.

[3]Based on 10 hours required per acre and assuming the farm operator and family do half the chopping and hoeing for which no charge is made.

[4]Delivered at the gin.

[5]Does not include expenses that are about the same for both cash-crop and dairy farming.

is practical for two reasons: (1) so the cost of making the change can be compared with the additional returns that will be obtained and (2) the cost of maintaining these additional improvements (depreciation and repairs) should be included with the other annual operating expenses of the dairy system since they would not be incurred by the cash-crop system.

Table 3 shows the estimated initial cost, expected useful life, annual depreciation and annual repairs of the improvements required. These data are based on estimates obtained from dairymen, Agricultural Extension Service personnel and business people in the area who could give reliable information. The total amount of $21,075 may be higher than required on farms that already have buildings and other improvements which can be converted to dairy use with little additional expense. A study of "Costs of Shifting from Cash Crops to Dairying on Central Texas Farms" by A. C. Magee, Progress Report 1640, indicates that a group of farmers with some such buildings and improvements on their farms before the shift was made had investment expenses that averaged about $3,000 less than others who had to make most all of the improvements.

About half the total investment is required for outright purchase of the dairy heard of 36 cows. Some farmers build their herds from a few cows over a period of years by saving all heifer offspring. The question whether it is more profitable to purchase the entire herd outright and realize immediate higher returns, or forego some returns by building the herd from offspring at less initial expense was not taken up here. It is important and should be included in a future study. Limited information seems to favor outright purchase of good stock for the "full-scale" operation.

The most costly investment items, other than the dairy herd, are the dairy barn, feeding barns and feed storage constructions including a 200-ton cement-lined trench silo. The silo was included because it seems to be profitable in the area. While some farmers may get by with an unlined trench at less expense, some soils in the area are not suited for that type.

The parlor-type barn equipped for bulk handling of milk may not be economically feasible. It seemed, however, to be the practical alternative, should a dairyman be starting out at present, in view of the trend toward bulk handling of milk and the favor it holds with the processors and distributors in the area.

The only additional field equipment purchased was a mower. The harvest of hay and silage was planned on a custom basis. This eliminates the necessity of owning some costly equipment that will be used infrequently and for short periods of time.

The crop system for dairy operation is planned to provide all the necessary grazing, hay and roughage for the dairy herd, and includes 35 acres of oats-clover, 30 acres of Sudan and 41 acres of forage sorghum. Twenty acres of the forage sorghum should yield 200 tons of silage on the average, and the remaining 21 acres should yield about 2 tons of baled hay per acre. Fertilizer was used only on the 35 acres of oats-clover. Since it was grazed, 200 pounds of 16-20-0 were applied per acre.

Income from the dairy herd is given in Table 4 and was based on an assumed level of milk production at 9,000 pounds annually per cow. This level seems justified in terms of the "good management" assumption in the cash-crop system. However, the farm operator could be more or less efficient in dairy management than in cash-crop farming.

The asumption is that half the calves will be heifers, that bull calves will be disposed of, that 8 of the heifer calves will be sold at birth for $5 each (allowing a loss of 1 heifer calf per year) and that 9 will be kept as replacement stock. Nine cull cows will be available for sale each year.

TABLE 3. ESTIMATED ADDITIONAL INVESTMENTS REQUIRED TO CHANGE FROM CASH-CROP TO DAIRY FARMING[1]

Item	Expected life	Initial cost	Annual depreciation	Annual repairs
	Years	— — — — Dollars — — — —		
Grade A parlor-type milking barn[2]	25	3,500	140.00	50.00
Tank and compressor for bulk handling	20	1,800	90.00	15.00
Feeding barns, sheds and feed storage	25	2,000	80.00	15.00
Silo[3]	20	1,500	75.00	5.00
Fencing: barbed wire	25	500	20.00	5.00
Electric	25	75	3.00	—
Water system	20	600	30.00	10.00
Field equipment[4]	10	300	30.00	5.00
Dairy herd: 36 cows		10,800[5]	—	—
Totals		21,075	468.00	105.00

[1]Based on estimates of dairy farmers, Agricultural Extension Service personnel and business people in the area who were in position to give reliable estimates, and on data contained in Texas Agricultural Experiment Station Progress Report 1640.

[2]Includes all equipment for the pipeline system.

[3]Cement-lined trench silo of 200-ton capacity.

[4]A mower. All other field equipment would be available except that which is custom hired for harvesting hay and silage.

[5]The price used was $300 per cow. Information on cow prices in the area seemed to justify this price for cows that would average producing about 9,000 pounds of milk annually.

TABLE 4. GROSS INCOME FOR THE DAIRY SYSTEM BY SOURCE

Item	Amount sold	Price	Receipts
Milk: 9,000 lb. per cow annually	3,219 cwt.[1]	$ 5 cwt.	$16,095
Calves[2]	8	$ 5 each	40
Cull cows	9	$75 each	675
Total income	—	—	$16,810

[1]21 cwt. of whole milk used for calves.

[2]Assumes one-half of the calf crop are heifers and 8 are sold at birth at $5 each. Bull calves are disposed of.

TABLE 5. OPERATING EXPENSES OF THE DAIRY SYSTEM

Item of expense		Rate	Price[1]	Cost
Crop expenses:				
Oats-clover (35 acres):	oat seed	3 bu. acre	.90 bu.	$ 94.50
	clover seed	15 lbs. acre	.12 lb.	63.00
	fertilizer (16-20-0)	200 lbs. acre	$94.00 ton	329.00
Sorghum for silage (20 acres):				
	seed	10 lbs. acre	.06 lb.	12.00
Harvesting:	cutting		$ 5.00 acre	100.00
	trucking		$ 6.50 acre	130.00
Sorghum for hay (21 acres):				
	seed[2]	50 lbs. acre	.06 lb.	63.00
Harvesting:	raking and baling	66 bales acre	.24 bale	332.64
Sudan (30 acres):	seed	10 lbs. acre	.08 lb.	24.00
Crop expense				$1,148.14
Herd expenses:				
Concentrates for cow herd		3,727 lbs. cow	$ 3.50 cwt.	4,696.00
Purchased feed for calves under 1 year				351.45[3]
Purchased feed for heifers over 1 year				88.65[3]
Artificial insemination			$ 7.00 cow	252.00
Veterinary and medicine			$ 3.00 cow	128.00[4]
Salt and minerals			$ 1.00 animal	54.00
Spray and powder			$ 1.50 cow	54.00
Hauling milk			.20 cwt.	643.80
Herd expense				6,267.90
Depreciation and repairs[5]				573.00[5]
Dairy expense				$7,989.04

[1]1955 prices in the area.

[2]Broadcast.

[3]Based on data obtained from dairy farmers in the area.

[4]Includes $20 for veterinary and medicine for the young stock.

[5]From Table 3.

Gross receipts from milk and stock sales would amount to $16,810.

Operating expenses which differ from those of the cash-crop system are given in Table 5. The largest expense was for feed. Since crops and pasture are sufficient to care for the grazing, hay and silage needs of the dairy herd, no expense was included for these items other than that necessary for crop production.

Such expenses total $7,989 which, when taken from the gross sales of $16,810 in Table 4, leaves returns of $8,821 from the dairy operation. This is directly comparable with the returns of $4,053 for the cash-crop system, and shows that a shift from cash-crop to dairying should increase net returns to the farm by about $4,768 annually.

The additional $4,768 represents a rate of return on the $21,075 investment of 22.6 percent annually. It would take about 4-½ years for the additional net returns to equal the cost of the changeover under the conditions specified.

PRODUCTION AND ADDITIONAL RETURNS

Research data indicate that many dairymen in the area obtain less than 9,000 pounds of milk per cow annually. However, it is possible, in view of experimental findings, and of production attainments in some of the major milk sheds, to obtain a level of production considerably higher than 9,000 pounds.

The following analysis shows the effect of higher and lower levels of production on the initial cost of making the shift to dairying, on operating costs and on the additional net returns that are obtained.

Table 7 contains data for three levels of milk production—a 7,000-pound, a 9,000-pound and a 12,000-pound per cow dairy herd. Initial costs of cow herds capable of producing at the different levels will vary. Information obtained in the area indicated that cows capable of producing at the lowest level cost about $200, cows capable of producing at the medium level about $300 and cows capable of producing at the highest level about $400. This indicates $3,600 less initial cost in a changeover to the lower producers, and $3,600 greater initial cost in a changeover to the higher producers, than the initial cost of shifting to the 9,000-pound level considered earlier.

TABLE 6. COMPARISON OF FINANCIAL REQUIREMENTS, EXPENSES AND RETURNS OF THE CASH-CROP AND DAIRY FARM SYSTEMS

Item	Cash-crop system	36-cow dairy system[1]
Additional investment required (dollars)	——	21,075
Gross returns (dollars)	5,779	16,810
Expenses that differ between the systems (dollars)	1,726	7,989
Returns less expenses (dollars)	4,053	8,821
Net returns from the adjustment (dollars)		4,768
Time it would take increased returns to equal the cost of change-over (years)		4.4

[1]Based on 9,000 pounds of milk per cow annually.

TABLE 7. LEVELS OF MILK PRODUCTION AND INITIAL INVESTMENT, COSTS AND RETURNS

Item	7,000 lb. per cow	9,000 lb. per cow	12,000 lb. per cow
Cost per cow	$ 200	$ 300	$ 400
Investment in cow herd	7,200	10,800	14,400
Rate of concentrates fed per cow[1]	3,443	3,727	4,184
Total cost of concentrates at $3.50 per cwt.	4,338	4,696	5,272
Total initial cost of the change-over	17,475	21,075	24,675
Total income from dairy	13,210	16,810	22,210
Operating costs[2]	7,631	7,989	8,565
Income less costs for dairy	5,579	8,821	13,645
Income less costs for cash-crop	4,053	4,053	4,053
Net income added by the shift	1,526	4,768	9,592
Years it would take increased returns to equal the initial costs of the change	11.5	4.4	2.6

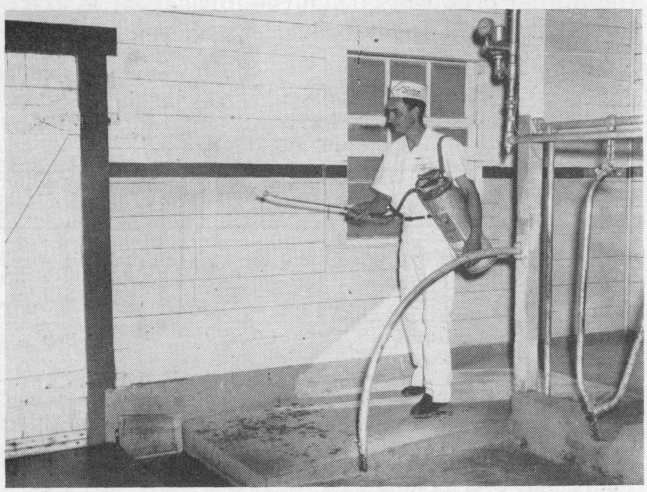
[1]Based on unpublished research data in the Department of Agricultural Economics and Sociology.

[2]Those costs that differ between the cash-crop and dairy system.

Operating costs will differ because of differences in the concentrate feed requirements for the different levels of production. Cows producing an average of 7,000 pounds of milk annually would require about 284 pounds less concentrate feed per cow annually than those producing 9,000 pounds of milk, and cows producing 12,000 pounds of milk annually would require an additional 487 pounds of concentrate feeds above that required by the 9,000-pound producers.

A farmer converting to dairy operations can expect only $1,526 additional net income annually above that of the cash-crop system if he produces at the 7,000-pound level. He can expect as much as $9,592 additional net income annually if he produces at the 12,000-pound level.

The above data assume enough hay and grazing to supply the dairy herd needs with no excess for sale at the different levels of production. It is possible that a small amount of excess hay may be available for sale if the cow herd produces only at the 7,000-pound level, or that some hay purchases may be necessary in poor crop years for the cow herd producing at the 12,000-pound level. With good crop management practices, a normal yield should produce sufficient hay, silage and grazing for the dairy herd, even at the 12,000-pound production level, on a farm of the type and size studied. In years of high yields, excess hay should be stored for use during the years of low yields.



Good management practices pay off in higher returns to the dairy operator.

It is unlikely that deviation from the situation assumed for hay and grazing would affect seriously the differences in additional net income by the production levels shown in Table 7.

EFFECT OF PRICE CHANGES

The discussion thus far has been based on price conditions that existed in the area in 1955. These conditions might change should milk prices become less favorable or more favorable than cotton, corn and oat prices—the crops grown and sold from the cash-crop system. Although no information is available on prices received by farmers in the central Blacklands for other years, data are availabe for average prices received by farmers in Texas as a whole. Since area prices would tend to vary in the same direction and in similar magnitude as State prices, an analysis of State price changes is given.

Table 8 presents a comparison of milk and cash-crop prices from 1948 through 1955. Earlier years were not included because the war years, with price controls and rationing, tended to distort the relationship between cash-crop and milk prices, and dairying in the Blacklands was in its beginning stage and markets were not well established at that time.

TABLE 8. CASH-CROP AND MILK PRICES AND THEIR RELATIONSHIP, 1948-55[1]

Year	Price indices		Ratio of milk price to cash-crop price[3]
	Cash-crop[2]	Milk	
1955 area price	100.0	100.0	100.0
State weighted average prices			
1948	127.5	122.2	95.9
1949	99.2	113.4	114.3
1950	128.3	105.2	82.0
1951	141.8	123.6	87.2
1952	136.0	137.8	101.3
1953	117.2	122.0	104.1
1954	119.6	109.2	91.3
1955	106.5	112.6	105.7

[1]Source: Prices 1948 through 1951 were those reported in Texas Agricultural Experiment Station Bulletin 764, Texas Farm Commodity Prices, June 1953. Prices 1952 through 1955 were supplied by Agricultural Estimates, AMS, USDA. Prices used are those that farmers received.

[2]The cash-crop price index is weighted by the production of cotton, corn and oats by the cash-crop system.

[3]Computed by dividing the index of milk price by the index of cash-crop price and multiplying by 100.

Column 3 of Table 8 shows the ratio of milk to cash-crop prices. A ratio less than 100 means that milk prices were lower than cash-crop prices in terms of the 1955 farm price relationship in the Blackland area. A ratio greater than 100 indicates milk prices were more favorable.

Milk prices varied from 18 percent below (in 1950) to 14 percent above (in 1949) cash-crop prices with the 1955 area price used as a base.

Table 9 shows how a change in the price relationship would affect the returns to be gained by shifting from a cash-crop to a 9,000-pound dairy herd operation. Should the cash-crop prices remain the same as that received by farmers in the area in 1955, but milk prices decrease by 18 percent below that level, the net returns added by shifting to dairy operations would amount to only $1,742. This is considerably less than the $4,768 additional returns expected with the area price relationship that existed in 1955. An 18 percent drop in milk price means a 63 percent drop in added net returns, while a 14 percent increase in milk price, with cash-crop prices constant, would increase the additional returns by 49 percent.

A small increase or decrease in the milk price relative to cash-crop prices, produces a much larger increase or decrease percentage-wise in the net returns gained by shifting to dairy operations. It emphasizes the importance of selecting carefully the prices to be used in planning future operations. A farm operator cannot avoid the responsibility of predicting future prices, but he should predict them as intelligently as possible.

Estimated annual net return to be gained by shifting from cash-crop to dairy farming is an average amount, and is likely to vary up or down each year from that average as prices change. The 18 percent decrease and 14 percent increase in milk price related to cash-crop prices used for the analysis represent the most extreme changes in the price relationship since 1948. The change normally was less drastic.

Actual returns to dairying vary less from year to year than do returns from cash-crop operations. The greater stability of dairy income is an asset when planning annual payments on a loan incurred to start dairying.

FINANCING THE ADJUSTMENT

A change from cash-crop to dairy farming should prove profitable to the central Blackland farmer with good management ability on farms of similar type and size to that taken for study. Considerable initial cost is involved, however, and it is likely most farmers would not have sufficient savings to completely finance the change.

A first step in attacking this problem is to take the operator who has the ability to operate a 36-cow dairy efficiently at the 9,000-pound per cow production level and question how many years would be needed to liquidate a debt made to finance the initial cost of the change. The answer depends both on the amount of credit needed and the amount available annually with which to repay the loan.

For most purposes, the farm operator should look to the net returns from an undertaking to repay its cost. Since this amounts to $4,768 for the adjustment considered, this amount will be used to analyze credit considerations.

Should a loan of $20,000 be needed—almost the full amount of the initial cost of the change—and annual payments be kept equal to or less than the added net returns of $4,768, about 6 years would be required to liquidate the debt. At 6 percent interest, the annual payment required to liquidate a $20,000 loan in 6 years would be about $4,067, Table 10. At 8 percent it would amount to about $4,326.

Under the conditions specified, it would not be financially possible to repay the loan in 3 years or less. A 3-year amortized debt of $20,000 requires annual payments of $7,482 to $7,761 at 6 to 8 percent, respectively, Table 10. This range is considerably more than the $4,768 forthcoming to use for that purpose.

Lending agencies are likely to require that the farm operator provide some of the initial cost unless considerable assets are advanced as security. They may prefer to loan no more, say, than 75 percent of the initial investment in the undertaking. Table 10 shows it still would require 4 years to liquidate a loan of $15,000 under those conditions. Should the lending agency insist on a 2 or 3-year loan, the farmer would have to resort to another source of income than that added by the change-over to repay the debt. If no other source is available, it would be impossible to meet the commitments.

A lending agency which serves the needs of farm operators efficiently must be in position to judge the management capability of applicants for loans.

TABLE 9. EFFECT OF CHANGING PRICE RELATIONSHIPS ON NET RETURNS ADDED BY SHIFTING TO DAIRYING

Item	Average milk price received by farmers		
	18 percent less than 1955 area price	1955 area price	14 percent greater than 1955 area price
Gross income from dairy (dollars)	13,784	16,810	19,163
Income less expenses (dollars)[1]	5,795	8,821	11,174
Net additional returns (dollars)[2]	1,742	4,768	7,121
Change in additional returns due to change in price (percent)[3]	— 63	00	+ 49

[1]Expenses were $7,989.

[2]Income less expenses for cash-crop farming was $4,053. This amount was subtracted from the dairy figure to obtain net additional returns.

[3]Greater or less than the added returns based on 1955 area prices.

TABLE 10. APPROXIMATE ANNUAL PAYMENTS REQUIRED TO LIQUIDATE AMORTIZED LOANS OF $20,000, $15,000 AND $10,000 AT VARIOUS INTEREST RATES AND FOR SPECIFIED REPAYMENT PERIODS

Repayment period	Annual payments on a $20,000 loan at:		Annual payments on a $15,000 loan at:		Annual payments on a $10,000 loan at:	
	6 percent	8 percent	6 percent	8 percent	6 percent	8 percent
Years	— — — — — — — — — — — — — —		Dollars— — — — — — — — — — — — — —			
1	21,200	21,600	15,900	16,200	10,600	10,800
2	10,909	11,215	8,182	8,416	5,454	5,608
3	7,482	7,761	5,612	5,821	3,741	3,880
4	5,772	6,038	4,329	4,529	2,886	3,019
5	4,748	5,009	3,561	3,757	2,374	2,505
6	4,067	4,326	3,050	3,245	2,034	2,168
7	3,583	3,841	2,687	2,881	1,791	1,921
8	3,221	3,480	2,416	2,610	1,610	1,740
9	2,940	3,202	2,205	2,401	1,470	1,601
10	2,717	2,981	2,038	2,235	1,359	1,490
11	2,536	2,801	1,902	2,101	1,268	1,401
12	2,386	2,654	1,789	1,990	1,193	1,327
13	2,259	2,530	1,694	1,898	1,130	1,265
14	2,152	2,426	1,614	1,819	1,076	1,213
15	2,059	2,336	1,544	1,752	1,030	1,168
16	1,979	2,260	1,484	1,695	990	1,130
17	1,909	2,193	1,432	1,644	954	1,096
18	1,847	2,134	1,385	1,601	924	1,067
19	1,792	2,082	1,344	1,562	896	1,041
20	1,744	2,037	1,308	1,528	872	1,019

Previous analysis indicate that the net returns gained by shifting to a 36-cow dairy with a 7,000-pound average milk production level per cow would be only $1,526. Initial investment cost was $17,475 and, should credit be needed to finance 75 percent of that amount, it would take from 13 to 16 years to liquidate such a debt with additional returns from the undertaking, Table 11. It is unlikely that credit agencies would be willing to extend such terms.

As a final point, production at the 9,000-pound level is considered comparable in managerial ability with that assumed for the cash-crop operation. Should the farmer be less efficient at cash-crop farming than that assumed, his returns would be less than the computations have allowed, and a shift to a 7,000-pound level of dairy production would likely add more to net returns than the $1,526 considered here.

TABLE 11. TIME AND ANNUAL PAYMENTS REQUIRED TO LIQUIDATE AN AMORTIZED DEBT EQUAL TO THREE-FOURTHS OF THE INITIAL COST REQUIRED TO CHANGE FROM CASH-CROP TO DAIRYING WITH VARIOUS DAIRY PRODUCTION LEVELS

Item	Production levels of dairy herd		
	7,000 lb. per cow	9,000 lb. per cow	12,000 lb. per cow
Initial cost of change-over	$17,475	$21,075	$24,675
75 percent of initial cost[1]	13,100	15,800	18,500
Additional net returns at 1955 area prices	1,526	4,768	9,592
Years required to liquidate a 6 percent amortized loan equal to 75 percent of initial cost[2]	13	4	3
Amount of annual payment	$ 1,480	$ 4,560	$ 6,921
Years required to liquidate an 8 percent loan equal to 75 percent of initial cost[2]	16	5	3
Amount of annual payment	$ 1,480	$ 3,958[3]	$ 7,178

[1]Rounded to nearest $100.

[2]Assuming annual payments on debt do not exceed the expected additional net returns at 1955 area prices.

[3]To liquidate the loan in 4 instead of 5 years would require an annual payment of $4,770, only slightly in excess of the $4,768 additional returns expected.

Previous analyses of the changing relationship between cash-crop and milk prices showed that the additional net returns realized by an adjustment to dairying varies annually above and below the average expected with prices at their 1955 level, or with cash-crop and milk prices increasing and decreasing in the same proportion. Cost changes cause variation in returns as well. Weather, disease and other hazards are likely to cause realized returns in any one year to be more or less than planned returns.

Two possibilities seem feasible to cope with changing amounts available to apply on the principal and interest of a debt. The term of the loan could be lengthened, thereby lowering the annual amortized payments should the credit agency insist on a rigid schedule of annual amounts. Since a small percentage change in prices or costs will squeeze net returns by a much greater proportion, payments should be scheduled 25 to 40 percent below the expected additional returns to allow a safe margin for meeting such commitments if a rigid repayment schedule is used. In years of high returns, the farmer is likely to have excess funds that could be used to reduce the debt. He should have an agreement that this can be done.

What may prove the better possibility is to use a flexible repayment plan with the amount of annual payments contracted at some reasonable proportion of the realized net returns each year. This would assure liquidating the debt as early as possible, and guard against the possibility that

excess funds would be used elsewhere if the operator chooses not to apply them on the loan under the more rigid plan discussed in the preceding paragraph.

Credit considerations emphasize the necessity of a farmer planning carefully the initial cost of making an adjustment in his system of farming, what his credit needs will be, the amount of money he will have available annually to make repayments on a loan, and the length of time it will take to liquidate it. This information will better enable him to approach the lending agency with a sound plan for financing the adjustment, and to more nearly assess the economic feasibility of a change in farming. It also will help the credit agency assess the possibilities of the adjustment and the credit terms the farmer needs to operate his business efficiently.

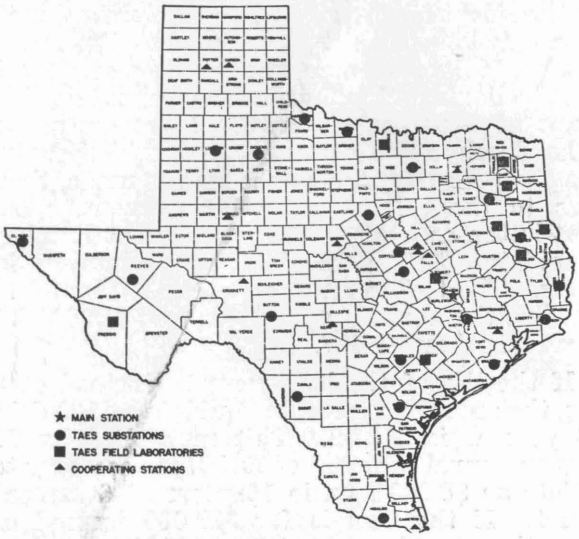
APPENDIX

Table 12 is provided as an aid in estimating the annual payments necessary to liquidate an amortized debt of any size when the interest rate and period of the loan are known. As an example of its use, take a farmer who requires an $8,000 loan to be liquidated in 6 years and can obtain this amount at 6 percent interest. Move down the left hand column to the number 6, which designates the period for which the loan is made, then across to the column headed 6 percent. The $20.34 is the amount of annual payment it takes to liquidate a $100 debt at 6 percent interest in 6 years. The $20.34 must be multiplied by 80 to determine the annual payment on an $8,000 debt, or approximately $1,627.

If the life of the loan were 10 instead of 6 years, the annual payment to liquidate a $100 debt at 6 percent is $13.59. This multiplied by 80 shows an annual payment of $1,087 is necessary to liquidate an $8,000 loan in 10 years at 6 percent interest. If the loan is for $12,000 instead of $8,000, the annual payments on a $100 loan must be multiplied by 120 instead of 80 to determine the annual payments necessary to liquidate the larger amount in the length of time considered.

TABLE 12. APPROXIMATE ANNUAL PAYMENTS NECESSARY TO LIQUIDATE AN AMORTIZED LOAN OF $100 AT VARIOUS INTEREST RATES AND FOR SPECIFIED PERIODS

Period for which loan is made	Approximate annual payments for specified interest rates						
	5 percent	5½ percent	6 percent	6½ percent	7 percent	7½ percent	8 percent
Years	— Dollars —						
1	105.00	105.50	106.00	106.50	107.00	107.50	108.00
2	53.78	54.16	54.54	54.93	55.31	55.69	56.08
3	36.72	37.07	37.41	37.76	38.11	38.45	38.80
4	28.20	28.53	28.86	29.19	29.52	29.86	30.19
5	23.10	23.42	23.74	24.06	24.39	24.72	25.05
6	19.70	20.02	20.34	20.66	20.98	21.30	21.63
7	17.28	17.60	17.91	18.23	18.56	18.88	19.21
8	15.47	15.79	16.10	16.42	16.75	17.07	17.40
9	14.07	14.38	14.70	15.02	15.35	15.68	16.01
10	12.95	13.27	13.59	13.91	14.24	14.57	14.90
11	12.04	12.36	12.68	13.01	13.34	13.67	14.01
12	11.28	11.60	11.93	12.26	12.59	12.93	13.27
13	10.65	10.97	11.30	11.63	11.97	12.31	12.65
14	10.10	10.43	10.76	11.09	11.43	11.78	12.13
15	9.63	9.96	10.30	10.64	10.98	11.33	11.68
16	9.23	9.56	9.90	10.24	10.59	10.94	11.30
17	8.87	9.20	9.54	9.89	10.24	10.60	10.96
18	8.55	8.89	9.24	9.59	9.94	10.30	10.67
19	8.27	8.62	8.96	9.32	9.68	10.04	10.41
20	8.02	8.37	8.72	9.08	9.44	9.81	10.19



Location of field research units in Texas maintained by the Texas Agricultural Experiment Station and cooperating agencies

State-wide Research

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The Texas Agricultural Experiment Station is the public agricultural research agency of the State of Texas, and is one of nine parts of the Texas A&M College System

IN THE MAIN STATION, with headquarters at College Station, are 16 subject-matter departments, 2 service departments, 3 regulatory services and the administrative staff. Located out in the major agricultural areas of Texas are 21 substations and 9 field laboratories. In addition, there are 14 cooperating stations owned by other agencies, including the Texas Forest Service, the Game and Fish Commission of Texas, Texas Prison System, the U. S. Department of Agriculture, University of Texas, Texas Technological College and the King Ranch. Some experiments are conducted on farms and ranches and in rural homes.

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THE TEXAS STATION is conducting about 350 active research projects, grouped in 25 programs which include all phases of agriculture in Texas. Among these are: conservation and improvement of soils; conservation and use of water in agriculture; grasses and legumes for pastures, ranges, hay, conservation and improvement of soils; grain crops; cotton and other fiber crops; vegetable crops; citrus and other subtropical fruits, fruits and nuts; oil seed crops—other than cotton; ornamental plants—including turf; brush and weeds; insects; plant diseases; beef cattle; dairy cattle; sheep and goats; swine; chickens and turkeys; *animal diseases and parasites; fish and game on farms and ranches; farm and ranch engineering;* farm and ranch business; marketing agricultural products; rural home economics; and rural agricultural economics. Two additional programs are maintenance and upkeep, and central services.

RESEARCH RESULTS are carried to Texas farm and ranch owners and homemakers by specialists and county agents of the Texas Agricultural Extension Service.